

What is claimed:

1. An ablation probe, comprising:
an elongated member;
a heat ablative element mounted to a distal end of the elongated member;
a thermoelectric cooling device mounted to the elongated member in thermal communication with the ablative element.
2. The ablation probe of claim 1, wherein the elongated member is rigid.
3. The ablation probe of claim 1, comprising a plurality of thermoelectric cooling devices mounted to the elongated member in thermal communication with the ablative element.
4. The ablation probe of claim 1, wherein the thermoelectric device is formed as an elongated tube that extends through the elongated member.
5. The ablation probe of claim 1, wherein the thermoelectric device is in direct contact with the ablative element.
6. The ablation probe of claim 1, wherein the ablative element is a radio frequency (RF) electrode.
7. The ablation probe of claim 1, wherein the ablative element comprises a plurality of tissue penetrating needle electrodes.
8. The ablation probe of claim 1, further comprising a heat sink thermally coupled to the thermoelectric device.
9. The ablation probe of claim 8, wherein the heat sink comprises a heat sink rod that extends through the elongated member, and a plurality of cooling fins formed at a proximal end of the heat sink rod.

10. The ablation probe of claim 8, wherein the thermoelectric device comprises a cold side in thermal communication with the ablative element and a hot side in thermal communication with the heat sink.

11. An ablation system, comprising:
the ablation probe of claim 1;
thermal control circuitry electrically coupled to the thermoelectric device, the control circuitry configured for transmitting a signal to the thermoelectric device, whereby the thermoelectric device cools the ablative element.

12. The ablation system of claim 11, further comprising an ablation source coupled to the ablative element.

13. The ablation system of claim 12, further comprising a console containing the thermal control circuitry and ablation source.

14. An ablation probe, comprising:
an elongated member;
a cryogenic ablative element mounted to the distal end of the elongated member;
and

a thermoelectric device mounted to the elongated member in thermal communication with the ablative element, wherein the thermoelectric device is configured to cool the ablative element.

15. The ablation probe of claim 14, wherein the elongated member is rigid.

16. The ablation probe of claim 14, wherein the thermoelectric device is in direct contact with the ablative element.

17. The ablation probe of claim 14, wherein the ablative element is a heat/cryogenic ablative element.
18. The ablation probe of claim 17, wherein the ablative element is a radio frequency (RF) electrode.
19. The ablation probe of claim 14, further comprising a heat sink thermally coupled to the cooling device.
20. The ablation probe of claim 19, wherein the heat sink comprises a heat sink rod that extends through the elongated member, and a plurality of cooling fins formed at a proximal end of the heat sink rod.
21. The ablation probe of claim 19, wherein the thermoelectric device comprises a cold side in thermal communication with the ablative element and a hot side in thermal communication with the heat sink.
22. An ablation system, comprising:
the ablation probe of claim 14,
control circuitry electrically coupled to the thermoelectric device, the control circuitry configured for transmitting a signal to the thermoelectric device, whereby the thermoelectric device cryogenically cools the ablative element.
23. An ablation probe, comprising:
an elongated member;
a heat ablative element mounted to a distal end of the elongated member; and
a thermoelectric heating device mounted to the elongated member in thermal communication with the ablative element, wherein the thermoelectric device is configured to heat the ablative element.

24. The ablation probe of claim 23, wherein the elongated member is rigid.
25. The ablation probe of claim 23, wherein the thermoelectric device is in direct contact with the ablative element.
26. An ablation system, comprising:
the ablation probe of claim 23,
thermal control circuitry electrically coupled to the thermoelectric device, the control circuitry configured for transmitting a signal to the thermoelectric device, whereby the thermoelectric device heats the ablative element.
27. An ablation probe, comprising:
a delivery cannula having a lumen and a distal end;
an inner probe member slideably disposed within the cannula lumen;
a first tissue ablation electrode mounted to the cannula distal end;
a second tissue ablation electrode mounted to a distal end of the probe member, wherein the first and second electrodes are configured to placed into a bipolar configuration; and
a thermoelectric cooling device mounted to one of the delivery cannula and inner probe member in thermal communication with the respective one of the first and second electrodes.
28. The ablation probe of claim 27, wherein the elongated member is rigid.
29. The ablation probe of claim 27, wherein the thermoelectric cooling device is mounted to the delivery cannula in thermal communication with the first electrode.

30. The ablation probe of claim 27, wherein the thermoelectric cooling device is mounted to the inner probe member in thermal communication with the second electrode.

31. The ablation probe of claim 27, wherein the thermoelectric device is in direct contact with the respective one of the first and second electrodes.

32. The ablation probe of claim 27, wherein the first and second electrodes are radio frequency (RF) electrodes.

33. The ablation probe of claim 27, wherein the second electrode is a tissue-penetrating electrode.

34. The ablation probe of claim 27, wherein the inner probe member is removable from the cannula.

35. An ablation probe, comprising:
an elongated member;
a heat ablative element mounted to a distal end of the elongated member, the ablative element having a hollow cylindrical portion; and
a plurality of discrete cooling devices circumferentially distributed around an inner surface of the cylindrical portion.

36. The ablation probe of claim 35, wherein the elongated member is rigid.

37. The ablation probe of claim 35, wherein the cooling devices are thermoelectric cooling devices.

38. The ablation probe of claim 35, wherein the ablative element is a radio frequency (RF) electrode.

39. The ablation probe of claim 35, wherein the ablative element is a tissue-penetrating electrode.

40. The ablation probe of claim 35, further comprising a heat sink thermally coupled to the cooling devices.

41. The ablation probe of claim 40, wherein the heat sink comprises a heat sink rod that extends through the elongated member, and a plurality of cooling fins formed at a proximal end of the heat sink rod.

42. An ablation system, comprising:
the ablation probe of claim 35,
thermal control circuitry configured for independently controlling the respective cooling devices, whereby the cooling devices cool the ablative element.

43. The ablation system of claim 42, further comprising an ablation source coupled to the ablative element.

44. The ablation system of claim 43, further comprising a console containing the thermal control circuitry and ablation source.

45. An ablation probe, comprising:
an elongated member;
a heat ablative element mounted to a distal end of the elongated member; and
a plurality of discrete circumferentially distributed cooling devices in thermal communication with the ablative element.

46. The ablation probe of claim 45, wherein the elongated member is rigid.

47. The ablation probe of claim 45, wherein the cooling devices are thermoelectric cooling devices.

48. The ablation probe of claim 45, wherein the cooling devices are in direct contact with the ablative element.

49. The ablation probe of claim 45, wherein the ablative element is a radio frequency (RF) electrode.

50. The ablation probe of claim 45, wherein the ablative element is a tissue-penetrating electrode.

51. The ablation probe of claim 45, further comprising a heat sink thermally coupled to the cooling devices.

52. The ablation probe of claim 51, wherein the heat sink comprises a heat sink rod that extends through the elongated member, and a plurality of cooling fins formed at a proximal end of the heat sink rod.

53. An ablation system, comprising:
the ablation probe of claim 45,
thermal control circuitry configured for independently controlling the respective cooling devices, whereby the cooling devices cool the ablative element.

54. The ablation system of claim 53, further comprising an ablation source coupled to the ablative element.

55. The ablation system of claim 54, further comprising a console containing the thermal control circuitry and ablation source.

56. An ablation system, comprising:
an elongated member;
a heat ablative element mounted to a distal end of the elongated member;

a plurality of thermoelectric cooling devices mounted to the elongated member in thermal communication with the ablative element; and

thermal control circuitry electrically coupled to the thermoelectric device, the control circuitry configured for independently transmitting signals to the respective thermoelectric devices, whereby the thermoelectric devices heat the ablative element.

57. The ablation system of claim 56, further comprising an ablation source coupled to the ablative element.

58. The ablation system of claim 58, further comprising a console containing the thermal control circuitry and ablation source.

59. The ablation system of claim 56, wherein the thermal control circuitry is configured to selectively turn the thermoelectric devices off.

60. The ablation system of claim 59, wherein the thermal control circuitry is configured to selectively turn the thermoelectric devices off based on a feedback signal.

61. The ablation system of claim 56, wherein the thermal control circuitry is configured for cycling each thermoelectric device with a uniform duty cycle.

62. The ablation system of claim 61, wherein the thermal control circuitry is configured for independently varying the uniform duty cycles of the thermoelectric devices.

63. The ablation system of claim 56, wherein the thermal control circuitry is configured for independently transmitting signals with different amplitudes to the thermoelectric devices.

64. An ablation console, comprising:

a tissue ablation source;

thermal control circuitry configured for transmitting electrical signals to a thermoelectric device.

65. The ablation console of claim 64, wherein the ablation source is a radio frequency (RF) source.

66. An ablation console, comprising:
a tissue ablation source;
thermal control circuitry configured for independently transmitting electrical signals to a plurality of thermoelectric devices.

67. The ablation console of claim 66, wherein the ablation source is a radio frequency (RF) source.

68. The ablation console of claim 66, wherein the thermal control circuitry is configured to selectively turn the thermoelectric devices off.

69. The ablation console of claim 66, wherein the thermal control circuitry is configured to selectively turn the thermoelectric devices off based on a feedback signal.

70. The ablation console of claim 66, wherein the thermal control circuitry is configured for cycling each thermoelectric device with a uniform duty cycle.

71. The ablation console of claim 70, wherein the thermal control circuitry is configured for independently varying the uniform duty cycles of the thermoelectric devices.

72. The ablation console of claim 66, wherein the thermal control circuitry is configured for independently transmitting signals with different amplitudes to the thermoelectric devices.

73. A method of ablating tissue divided into a plurality of radial sectors, comprising:
- introducing a heating element adjacent an origin of the radial sectors;
 - radially conveying thermal energy from the heating element into the radial tissue sectors; and
 - selectively cooling the radial tissue sectors.
74. The method of claim 73, wherein the tissue is ablated by the heating element.
75. The method of claim 73, wherein the radial tissue sectors are selectively cooled by selectively not cooling one or more radial tissue sectors.
76. The method of claim 73, wherein the radial tissue sectors are selectively cooled by cooling one or more radial tissue sectors less than the remaining radial tissue sectors.
77. The method of claim 73, wherein the radial tissue sectors are selectively cooled with a plurality of discrete circumferentially distributed cooling devices.
78. The method of claim 77, wherein the radial tissue sectors are selectively cooled by turning off one or more cooling devices during the ablation process.
79. The method of claim 77, wherein the radial tissue sectors are selectively cooled by cycling each of the cooling devices with a uniform duty cycle, wherein duty cycles of the cooling devices are selected to be different.
80. The method of claim 77, wherein the radial tissue sectors are selectively cooled by transmitting signals with different amplitudes to the cooling devices.

81. The method of claim 74, wherein the cooling devices are thermoelectric cooling devices.

82. The method of claim 73, wherein the thermal energy is radio frequency (RF) energy.

83. The method of claim 73, wherein a blood vessel is contained within one or more of the radial tissue sectors, and at least one of the one or more radial tissue sectors is selectively not cooled.

84. The method of claim 73, wherein the tissue is abnormal tissue.

85. The method of claim 84, wherein the abnormal tissue is a tumor.